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Method for production of a component

The invention relates to a method for production of a component according to the preamble of claim 1.

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During the production of components, it is often necessary for still further parts to be firmly connected to the component.

Such a method is disclosed, for example, by EP 868 253 B1. In  
10 this method, a filling element within a groove is firmly connected to the component. However, the connection between the filling element and the component in the groove is not sufficiently adequate, since the solder or the connecting layer between the filling element and the component is not uniform or  
15 is incomplete.

The object of the invention is therefore to overcome this problem.

20 The object is achieved by a method as claimed in claim 1.

Further advantageous measures are listed in the subclaims. The measures listed in the subclaims can advantageously be combined with one another.

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The invention is explained in more detail in the following text by using figures, in which:

30 figures 1, 2, 3 and 4 show a plurality of method steps of the method according to the invention,

figure 5 shows a view of a component which is produced by the method according to the invention, and

5 figure 6 shows a component after being finished by the method according to the invention.

Figure 1 shows a component 1 in a first method step.

10 The component 1 has, for example, a groove 4. The component 1 is, for example, a gas turbine component, such as a turbine blade. Following use, the turbine blade exhibits cracks, which are to be repaired. Such a method is explained in more detail in EP 868 253 B1 and is intended to be the disclosure of this application. In this method, the groove 4 is produced as in 15 figure 1, or there is an appropriate groove 4.

Figure 2 shows the component 1 in a further method step of the method according to the invention.

20 A filling element 7 is to be connected firmly to the component 1 on a surface 8 of the component 1 or in a groove 7 (fig. 2).

A distance d of the filling element 7 from the base 5 in the groove 4 can be zero or greater than zero.

25 In a gap 6 which is present between the filling element 7 and the component 1 in the groove 4, for example at least one spacer 10 is arranged, for example in the vicinity of the surface 8 of the component 1. In this way, a uniform gap can 30 be achieved on both sides between the filling element 7 and the component 1 in the groove 4.

Figure 3 shows the component 1 in a further method step of the method according to the invention.

In order to keep the filling element 7 in a fixed position  
5 during a fixing method for fixing the filling element 7 to the component 1, use is made of a holder 13 which connects the filling element 4 to the component 1 at least temporarily during a fixing method.

10 The holder 13 has at least one first holding point 22 on the surface 8 of the component 1 and at least one second holding point 25 on the filling element 7. The spacers 10 (Fig. 2) have been removed, for example following the fitting of the holder 13, but can also remain in the gap 6.

15 In particular, the holder 13 has the shape of a letter M. A first end of the M shape of the holder 13 constitutes the first holding point 22 on the component 1. The second end of the M shape of the holder 13 constitutes a third fixing point 28 on  
20 the component 1. In the middle of the M shape, the holder 13 is fixed to the filling element 7 at the holding point 25.

As a result of the M shape of the holder 13, an open cavity 19 is produced under the limbs of the M shape. As a result, the  
25 gap 6 is also freely accessible under the holder 13.

In order to fix the filling element 7 to the component 1, various fixing methods are available to choose. These are, for example, welding, lasering or electron beam welding and  
30 soldering methods.

Figure 4 shows, by way of example, the procedure for a soldering method.

A solder material 16, for example in the form of solder paste  
5 or solder powder, is applied, in particular in the vicinity of  
the gap 6. In a soldering process, the solder material 16 is  
melted and penetrates into the gaps 6 and fills them  
completely. In addition, if there is a distance  $d$  between  
filling element 7 and base 5 which is different from zero, a  
10 hollow volume between filling element 7 and base 5 can be  
filled with the solder material.

Figure 5 shows a view of a component 1 according to figure 3.  
The view shows that two holders 13 are used in order to hold  
15 the filling element 7 in the groove 4. However, only one or  
else more than two holders 13 can also be used.

Figure 6 shows a component 1 which has been produced by the  
method according to the invention.

20 After a soldering operation, used by way of example, or after  
another fixing method, a connecting layer 16 or a solder layer  
16 has been produced between the filling element 7 and the  
component 1, in the gap 6 previously present. In this way, a  
25 fixed connection is produced between the filling element 7 and  
the component 1. Excess solder material on the surface 8 and  
the at least one holder 13 are removed in a last method step,  
for example by grinding.

30 If the filling element 7 is welded on in the groove 4, then,  
depending on the welding method, only a partial connection can  
be produced between the filling element 7 and the component 1,  
at the points

where the holder 13 is not present. In this case, a connection, welded seam, is produced at the accessible points. As a result, an adequately firm connection is provisionally produced between filling element 7 and the component 1. The at 5 least one holder 13 can then be removed and the freely accessible region of the gap 6, which was previously hidden under the holder 13, can likewise be provided with a connecting layer 16 by means of welding or other connecting methods. The filling element 7 is then connected completely to the 10 component.

Such a method can be used when repairing cracks.